Appendix G

Calculating Hydraulic Conductivity from Well Log Pumping Test Data

EQUATION #1 [Modified Cooper-Jacob Equation (Driscoll, 1986)]:

$$T = [(Q/s)(1500)] / 7.48$$

where:

T = transmissivity (feet^2/day)

Q = pumping rate (gpm)

s = drawdown (feet) *{this is the difference between static water level and pumping water level}.*

1500 = factor used for unconfined aquifer; value should be 2000 for a confined aquifer.

EQUATION #2 [Razack and Huntley Equation (Fetter, 1994)]:

$$T = 33.6 \left[\frac{Q}{s} \right]^{0.67}$$

where:

T = transmissivity (feet^2/day)

Q = pumping rate (feet^3/day) *{Note that these units are feet^3/day, not gpm. To convert from gpm, which is used on well logs, to feet^3/day use the following equation: Q (gpm) x 192.5 = Q (feet^3/day)}*

s = drawdown (feet) *{this is the difference between static water level and pumping water level}.*

33.6 = units conversion factor

(Note that 0.67 is an exponent)

EQUATION #3 [Convert T in above equations to hydraulic conductivity (K)]:

$$\mathbf{K = T/b}$$

where:

K = hydraulic conductivity (feet/day)

T = transmissivity (feet^2/day)

b = aquifer thickness (feet). *{Aquifer thickness is dependent on whether the well is completed with; 1) a perforated casing (or screen), 2) an open bottom (also known as an open casing) or, 3) an open hole. An open bottom well is completed by extending the well casing to the bottom of the borehole with no casing perforations, all water enters through the bottom of the casing. An open hole well is completed by continuing to drill a borehole beyond the bottom of the casing, this type of well is typically drilled into bedrock which allows the borehole to remain open without a casing. The aquifer thickness used for each type of well is listed as follows:*

WELL COMPLETION	*AQUIFER THICKNESS (b)*
Perforated or screened	*Perforation/screen thickness*
Open bottom	*10 feet*
Open hole	*Open hole interval (i.e. distance between bottom of casing and bottom of borehole)*